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(54) THREAD-CONTAINING PAPER FOR PREVENTING COUNTERFEIT

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a thread-containing paper for preventing counterfeit useful for bill, etc., excellent in printability, hardly curling, by making a water elongation in the width direction a fixed value or smaller than it.

SOLUTION: In this paper for preventing counterfeit obtained by adding a thread prepared by providing one side or both sides of a filamentous or a taped substrate with a thermoplastic and/or a water remoistening adhesive layer to a paper layer and making a paper, the water elongation in the width direction of the paper for preventing counterfeit is $\leq 4.3\%$. Preferably the substrate is a polyethylene terephthalate film having about 10-100 μm thickness and excellent in strength in spite of thinness.

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CLAIMS

[Claim(s)]

[Claim 1] it is ***** in paper about the thread which prepared the thermoplastic and/or **** humid adhesives layer in one side or both sides of a base material of the shape of the shape of yarn, and a tape -- the forged prevention form containing a thread characterized by whenever [flooding flexible / in the cross direction of this forged prevention form] being 4.3% or less in a forged prevention form.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the manufacture approach of the forged prevention form containing a thread.

[0002]

[Description of the Prior Art] Since forgery of negotiable securities becomes easy and serves as a big social problem by advance of a copying machine technique in recent years, various kinds of forged preventive measures are given so that a bill, a gift certificate, a check, a stock certificate, a passport, an identification card, a card, etc. cannot be altered unjustly and cannot be forged.

[0003] as forged preventive measures, it is ***** about a filament (a thread is called) between paper given in JP,48-75808,A, JP,52-48660,B, JP,51-130308,A, etc. — there is a forged prevention form called the so-called paper containing yarn.

[0004] Between paper, generally the gestalt of a ***** thread is about 10-100 micrometers in thickness, and it is the thing of the shape of the shape of yarn with a width of about 0.2-30mm, and a tape, for example, gold thread, silver thread, a plastic film, a metal vacuum evaporation film, etc. are used. Although the hologram with a very difficult duplicate, the pixel gram, the grating image, etc. are stuck on the credit card, the bill, etc. in order to prevent forgery by the technique of an advanced copying machine in recent years, these are also used as a thread. it is ***** about these threads — it is difficult to be unable to forge the metallic luster part of a thread, even if a copying machine copies a forged prevention form, but to alter.

[0005] However, in case the forged prevention form containing a thread performs a lifting and process printing which becomes empty for the torsion curl by humidity as compared with the usual paper, it has the fault of being easy to generate a trouble on a printing machine.

[0006]

[Problem(s) to be Solved by the Invention] This invention relates to the forged prevention form which was extremely excellent in the printability, without causing most curl which caused the trouble at the time of printing the forged prevention form containing a thread.

[0007]

[Means for Solving the Problem] generating of torsion curl according [this invention persons] to the humidity of the forged prevention form containing a thread etc., and various quality of paper — as a result of inquiring wholeheartedly about relevance with data, it came to complete a header and this invention for being able to twist, when whenever [flooding flexible] is smaller than a specific value, and generating of curl being suppressed remarkably.

[0008] that is, this invention is ***** in paper about the thread which prepared the thermoplastic and/or **** humid adhesives layer in one side or both sides of a base material of the shape of the shape of yarn, and a tape — in a forged prevention form, it is the forged prevention form containing a thread characterized by whenever [flooding flexible / in the cross direction of this forged prevention form] being 4.3% or less.

[0009]

[Embodiment of the Invention] The forged prevention form of this invention inserts between paper the thread which applied adhesives to the base material front face, and was dried beforehand in the **** doubling process of a paper machine, and is dried and obtained so that a thread may separate easily or it may not fall out. In this way, the obtained forged prevention form performs desired printing, desired cutting, etc. usually further, prepares a bill, a gift certificate, and a magnetic-recording layer, and is used for a ticket, a prepaid card, etc.

[0010] Generally, although process printing is performed to printing of forged prevention, if curl occurs, it will become difficult for many troubles, such as jamming, to occur, to be stabilized on a printing machine, and to perform continuation operation. If the curl generated at the time of printing is usual convex curl and usual concave curl, the trouble on a printing machine can be beforehand prevented by arranging the direction of curl intentionally. However, in torsion curl, it is not concerned towards curl but is easy to become the cause of a trouble.

[0011] Not all are solved about the cause which torsion curl generates, when it has a fixed include angle or the sense the pulp fiber at the time of paper making generally carries out [the sense] orientation produces the difference of a rate of drying crosswise [of paper] at a desiccation process to the flow direction of paper, it can twist, and it is said that curl occurs. Although it is not necessarily clear about the cause which can twist in the forged prevention form containing a thread, and especially curl tends to generate, it is guessed as follows.

[0012] That is, after many threads have also pasted up the forged prevention form containing a thread on specific width of face between paper, in order that ***** rare ***** and each thread may pull the paper whose heat shrink is not dried a lifting and near a thread at the desiccation process of a paper machine, between a thread and the left part, distortion is produced, paper is dried as it is, and distortion is fixed. Distortion fixed to the interior of paper is released in part at the time of telescopic motion of the paper by humidity etc., and is considered to generate torsion curl. Therefore, the one where the force in which the width of a thread pulls paper widely is strong tends to produce distortion, and, as a result, it is easy to generate curl.

[0013] although it is good if it is made not to produce distortion inside paper or paper is not made to expand and contract by humidity etc. in order to prevent torsion curl, distortion does not arise with the existing facility --- as --- a thread --- ***** --- things are technically difficult.

[0014] This invention holds down whenever [flooding flexible / of a forged prevention form] to the specific range, is considering as the forged prevention form which was extremely excellent in dimensional stability, and suppresses telescopic motion of the paper which caused torsion curl to the minimum. That is, whenever [flooding flexible / by which the forged prevention form of this invention is measured by the following approach] must be 3.8% or less preferably 4.3% or less.

[0015] Whenever [flooding flexible / which is applied to this invention] is the value which measured the elongation percentage of the cross direction of the paper at the time of using a tester whenever [flooding flexible / of FENCHIERU] and making a sample underwater flooded for 5 minutes.

[0016] It can twist, if a forged prevention form incidentally expands and contracts rapidly in the range whenever [flooding flexible / whose] is 3.8% - 4.3%, and curl may be generated, and it can twist at 4.3% or more, and is easy to generate curl, and it becomes difficult for it to be stabilized and to carry out continuation printing of the forged prevention form.

[0017] Moreover, in order not to generate torsion curl, it is important to make as small as possible distortion fixed to the interior of paper, and, as for the width of the thread used for the forged prevention form of this invention, it is desirable that it is 2.5mm or less.

[0018] In addition, although the paper of multilayer **** is usually manufactured by the cylinder machine, it is difficult for whenever [flooding flexible] to become about 5% in this case, and to manufacture the small paper of whenever [flooding flexible / like this invention] with a common paper machine. However, a Yankee dryer is combined with the desiccation process of a paper machine, and manufacture of the forged prevention form of this invention becomes comparatively easy by controlling desiccation conditions (canvas *****, dryer temperature gradient) etc. precisely.

[0019] Especially the class of adhesives for threads used for this invention is not limited, but well-known and the public resin constituents which can generally be used as heat-sealing adhesives or ***** adhesives, such as acrylic resin, styrene-butadiene system resin, styrene-isoprene system resin, polyester system resin, ethylene-vinyl acetate system resin, and vinyl acetate-vinyl alcohol system resin, are used.

[0020] These resin may be used as adhesives as they are, and may mix and use two or more resin. moreover, the need --- responding --- various kinds --- assistants, such as surface active agents, such as a well-known color and a well-known pigment, a defoaming agent, and a wetting agent, an antiblocking agent, lubricant, and a thickener, may be added.

[0021] The method of application of adhesives is performed by various coaters, such as brush coating, spray spreading, a roll coater, a MAIYA bar coating machine, a gravure roll coater, a blade coating machine, and an air knife coater, and desiccation is performed by the conventional approach combined with the above-mentioned coater. In addition, although about two 1 - 15 g/m of coverage is desirable at dry weight, if fewer than this,

sufficient bond strength will not be obtained, but if many, an adhesion function will be saturated, and it is not desirable on economy.

[0022] Although especially the thread base material used by this invention is not limited, generally a PET film with a thickness of about 10–100 micrometers which is thin and is excellent also in reinforcement is often used. Optical special processing of printing of metal vacuum evaporation, an alphabetic character, a pattern, etc., etc., a hologram, a pixel gram, a grating image, etc. can be performed to a PET film from forged prevention or the decorative object, or a magnetic-recording layer can be prepared and information can also be given. In addition, a thread base material carries out slit processing of the adhesives to predetermined width after spreading and desiccation, and is used as a thread.

[0023] In this way, the forged prevention form which inserts the obtained thread between paper at the **** doubling process of the well-known multilayer **** paper machine which combined various kinds of wire PERT, carries out coating of the various surface sizing compounds etc. with size press equipment etc. if needed in the middle of paper making, dries with a dryer and is made into the object is obtained. Coating, such as a surface sizing compound, may install size press equipment etc. between the dryers in the middle of desiccation, may perform it, after making it dry thoroughly, it may perform coating, and it may be made to dry it again. Moreover, a machine calender and supercalender processing may be performed to the obtained forged prevention form, or a pigment application layer, a heat-sensitive recording layer, a hot printing television layer, etc. may be prepared in a front face with various coating equipments.

[0024]

[Example] Although an example is shown below and this invention is more concretely explained to it, of course, this invention is not limited by this.

[0025] [Creation of Thread A] as a base material An aluminum vacuum evaporation PET film with a thickness of 12 micrometers Polyester system adhesives (trade name "PES-370S30" Toagosei Chemical Industry Co., Ltd. make) with dry weight at a 6 g/m² and PET side side to the aluminum vacuum evaporation side side (made from trade name "G1302E-12" diamond HOIRUHEKISUTO, Inc.) SBR system adhesives By the gravure roll coater, it applied and (trade name "SN337" Sumika ABS Latex Co. make) was dried so that it might be set to 4g/m² with dry weight. Subsequently, it rolled round to 1.0mm width by the micro slitting machine at the after [a slit] bobbin, and Thread A was obtained.

[0026] [Creation of Thread B] As a base material, to the aluminum vacuum evaporation with a thickness of 12 micrometers side side of an aluminum vacuum evaporation PET film (product made from trade name "G1302E-12" diamond HOIRUHEKISUTO, Inc.) Ethylene-vinyl acetate system adhesives The (trade name "SUMIKA flex time 301" Sumitomo Chemical Co., Ltd. make) is applied by the gravure roll coater so that it may be on a 9 g/m² and PET side side with 2 g/m² with dry weight with dry weight about acrylic adhesives (trade name "Nipol LX814" Nippon Zeon Co., Ltd. make). It was made to dry. Subsequently, it rolled round to 2.0mm width by the micro slitting machine at the after [a slit] bobbin, and Thread B was obtained.

[0027] [Manufacture of a forged prevention form]

The tape of a 1cmx1cm form is beforehand stuck at intervals of 1cm on the same periphery front face of the cylinder-mo-ld cylinder of eye one tub of the cylinder machine equipped with the cylinder vat of example 1 2 tub, the mesh is plugged up, and the paper as for which the 1cmx1cm hole was vacant every other cm as the first paper (air-dried U.S. tsubo 35 g/m²) was formed. It does not manipulate at the cylinder-mo-ld cylinder of eye two tubs, and the second plain paper (air-dried U.S. tsubo 70 g/m²) was formed. moreover, thread volume appearance is carried out, equipment is installed between the cylinders of eye one tub and eye two tubs, and it was made to be inserted in the location where a thread laps with the hole of the first paper with the sense to which an aluminum vacuum evaporation side side touches the second paper Machine calender processing of the humid paper (about 50% of moisture) milled with this paper machine is carried out after desiccation with the Yankee dryer (skin temperature of 88 degrees C) which touches the first paper, and six cylinder dryers (skin temperature of about 60 degrees C – 70 degrees C) following this. With the above-mentioned paper machine, Thread A was used and the forged prevention form of the type with which the thread repeated exposure and flasking on one side was obtained. In addition, whenever [flooding flexible / of the obtained forged prevention form] was 2.7%.

[0028] By the same approach as example 2 example 1, the temperature of a Yankee dryer was raised to 80 degrees C, the temperature of lowering and a cylinder dryer was raised to 60–80 degrees C, and the forged prevention form whenever [flooding flexible / whose] is 3.3% was obtained by it.

[0029] By the same approach as example 3 example 1, the temperature of a Yankee dryer was raised to 73

degrees C, the temperature of lowering and a cylinder dryer was raised to 60–100 degrees C, and the forged prevention form whenever [flooding flexible / whose] is 4.1% was obtained by it.

[0030] Thread B was used instead of the example 4 thread A, and the forged prevention form whenever [flooding flexible / whose] is 2.7% was obtained by the same approach as an example 1.

[0031] Thread B was used instead of the example 5 thread A, and the forged prevention form whenever [flooding flexible / whose] is 3.3% was obtained by the same approach as an example 2.

[0032] Thread B was used instead of the example 6 thread A, and the forged prevention form whenever [flooding flexible / whose] is 4.1% was obtained by the same approach as an example 3.

[0033] By the same approach as example of comparison 1 example 1, 60–120 degrees C of temperature of lowering and a cylinder dryer were raised for the temperature of a Yankee dryer to 62 degrees C, and the forged prevention form whenever [flooding flexible / whose] is 4.6% was obtained by it.

[0034] The forged prevention form was obtained by the same approach as an example 1 except having dried the skin temperature of 14 cylinder dryers as 60–110 degrees C, without using an example of comparison 2 Yankee dryer. In addition, whenever [flooding flexible / of the obtained forged prevention form] was 5.5%.

[0035] Thread B was used instead of the example of comparison 3 thread A, and the forged prevention form whenever [flooding flexible / whose] is 5.5% was obtained by the same approach as the example 2 of a comparison.

[0036] It carried to the printing room which set each forged prevention form processed into "assessment" lithography as temperature, and set 1000 humidity at a time as 20 degree C, 65%RH, and 30 degree C and 25%RH in piles, and the continuation printing test by the offset press was performed promptly. The following criteria estimated the printing operability at this time, and that result was shown in a table 1.

O : most curl is not seen but is extremely excellent in printing operability.

O Although jamming occurs rarely for :curl, it is satisfactory practically.

** : The jamming by curl occurs frequently and continuation operation is difficult. .

x : Curl is severe and cannot print.

[0037]

[A table 1]

	使用した スレッド	偽造防止用紙 の浸水伸縮度	印刷操作性	
			20°C65%RH	30°C25%RH
実施例 1	A	2. 7 %	◎	◎
実施例 2	A	3. 3 %	◎	○
実施例 3	A	4. 1 %	◎	△
実施例 4	B	2. 7 %	◎	○
実施例 5	B	3. 3 %	◎	△
実施例 6	B	4. 1 %	◎	△
比較例 1	A	4. 6 %	○	x
比較例 2	A	5. 5 %	○	x
比較例 3	B	5. 5 %	△	x

[0038]

[Effect of the Invention] When the flooding ductility of a forged prevention form is 3.8% or less so that clearly from the result of a table 1, it can print almost satisfactory, and at 3.8% – 4.3%, it is a little easy to generate the trouble by curl during printing, and it turns out at 4.3% or more that it may be unable to print according to conditions. Furthermore, it turns out that curl tends to get worse and those who used the thread B with large width tend to be influenced by the case where the thread A with narrow width is used, of printing conditions. From the above result, this invention can manufacture the forged prevention form which was extremely excellent in the printability with the existing facility.

[Translation done.]